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Citrus Fruits, Costs

What Citrus Fruits Cost Florida Growers In 1932-33

BY R. H. HOWARD

A study of citrus cost of production and returns has been carried on by the Agricultural Extension Service for four years. The study has been based upon records furnished by citrus growers cooperating with County Agents and other Extension workers. The results of those records obtained for 1930-31, 1931-32 and 1932-33 have been released as summaries each year on a year's operation, as most farm accounts are treated, which includes all expenses and receipts incurred during a 12-month period. However, after the issue of the Third Annual Summary of Costs and returns on a seasonal basis, numerous requests were made by cooperators for changing the method of handling the citrus accounts to a crop year basis, as the time necessary to produce and market a crop of citrus fruit ranges from 15 to 18 months—this time being dependent upon whether the grove consists of early or late varieties of fruit or both.

In April of this year, a new summary was prepared and mimeographed for distribution on a CROP YEAR basis. The costs used in this summary are from September 1, 1932 to August 31, 1933, and the returns from the same crop which was marketed beginning about October of 1933 to June 1934. It is upon this method of handling the citrus accounts that this discussion will be based.

The costs and returns given later in this talk are based on actual records, most of which were submitted monthly during the year in question. There were 264 grove records furnished by 171 cooperators located in 9 counties. One grove operator furnished 24 grove accounts on different grove properties. Of the 264 grove records obtained, 253 were in four counties, namely, Lake, Polk, Orange and Highlands. The remaining 11 grove records came from Osceola, Indian River, DeSoto, St. Lucie and Hillsborough counties.

Records were furnished by owners who operated and supervised their own groves, corporations which owned and operated their groves, and commercial caretakers who operated groves for absentee grove owners. The variation in size of groves was from 2.25 to 788 acres and the age from 4 to 41 years. The average number of acres per grove was 35.5 and the average age 14 years.

Of the 264 groves, 182 were over 10 years old and averaged 17 years of age and the remaining 82 groves were 10 years and under, averaging 8 years of age at the beginning of the cost year.

For the 182 groves over 10 years old the average cost per acre was $19.46 for labor, power and equipment; $17.73 for fertilizer; $3.13 for spray and dust material; $5.10 for taxes and $1.81 for miscellaneous expenses. This makes a total cost excluding interest on capital invested and depreciation on trees of $47.23 per acre, or a cost of $.51 per box harvested. There was an average of 92 boxes of fruit harvested per acre from these groves which brought $68.21 or an average of $.74 per box for all varieties. The difference between the average cost of production and returns was $20.98 per acre or approximately $.23 per box for the owner's supervision and interest on capital invested. The comparatively low yield harvested from these older groves may be partially explained by the windstorm that did considerable damage to the fruit in September of 1933. The fruit on the older and larger trees was affected most, due to size, thorns and hardness of wood as well as other physical condition of the trees. There was a range of fruit harvested from 2.5 to 405 boxes per acre.

The returns from fruit sold on 137 of the 182 groves over 10 years of age paid all costs other than owner's supervision and interest on capital invested and $23.15 per acre was left for the owner. However, these groves averaged 37 per cent greater yield, 1½ per cent less cost, 7 acres

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Summer Fertilizing For Groves

BY FRANK L. HOLLAND

MANAGER FLORIDA AGRICULTURAL RESEARCH INSTITUTE

With good rains falling quite generally, conditions are more favorable for applying fertilizers than they have been since last summer. In fact since the drought started about the first of October, 1934, a good many growers have been quite reluctant to use normal quantities or kinds of fertilizer knowing that the ground was powder dry and being in doubt as to just what benefit would be derived from fertilizers applied under such conditions.

With the weather man acting more kindly towards us now it seems that we might get back to normal again, apply the usual quantities of fertilizers and expect the usual results.

What Kind of Mixtures to Use

During recent months there have been, among others, two reports made by experimental workers pertaining to kinds of fertilizer mixtures that have proven to be the most efficient under varying soil conditions.

The State Experiment Station in its Annual Report for the fiscal year ending June 30, 1934, shows that at Lake Alfred, in the source of nitrogen tests, the plots receiving bone meal in the mixture continued to be the best. The report states that the quality of fruit was better on all the plots receiving bone meal, and that the difference in quality and yield between these plots and others was greater this year than last.

In these particular plots where the bone meal mixtures are outstanding, all of the phosphoric acid is derived from bone meal compared with superphosphate in adjoining plots, but this naturally also means that a considerable part of the ammonia in the mixtures is derived from bone meal. In other words the mixtures simulate the better summer type of mixtures made by most fertilizer companies for a long period of years.

In connection with these plots and reports, it is interesting to recall that a few years ago the "all mineral" plots were whooped up as being outstanding. However after ten years had passed the all mineral plots began to go backward, or it might be stated that the plots receiving fertilizers containing bone meal made outstanding progress and are accordingly better. At any rate, regardless of how you wish to state it, the plots receiving mixed fertilizers, including bone meal, are better in tree condition and size, and in yield and quality of fruit compared with the all mineral mixtures. This work is now over fourteen years old.

Some workers point out that mixtures containing reasonable quantities of bone meal and other very slow acting natural organics are of particular advantage for summer use due to the fact that very little of their ammonia is leached away by the summer rains, and that the tree and crop do not go through a period of starvation in the early fall. In fact some very practical workers claim that this is the big point in favor of using summer mixtures so designed, stating that such mixtures evenly feed the trees and keep them from going yellow or thin along in the latter part of August, September and early October, when the crop strain is getting heavy.

Other Reports of Similar Character

At the Horticultural Society meeting in April, a very interesting progress report was made by George M. Bahrt on the citrus fertilizer experiments being conducted by the Department of Agriculture in Florida. This was a very splendid report and will undoubtedly appear in print at an early date in full. With this in mind there is no occasion for an attempt to go into any particular detail of the report.

Probably one of the outstanding points of a practical nature that will appeal to growers was the fact that single strength basic fertilizers were outstandingly the most efficient when used on acid, sandy soils; and that single strength acid fertilizers were the most efficient of the various kinds tested on alkaline or calcareous soils. An exception to these statements was the report showing beneficial results when manganese was added to various fertilizer treatments. Manganese sulphate might be called a standard ingredient of fertilizers for much of the East Coast part of the State, but he and most workers seem to feel that there are insufficient facts at this time to warrant general recommendations for its use in fertilizers on the acid sandy soils that make up a large part of the citrus belt. Mr. Bahrt feels however that there are sufficient data to warrant its use on tangerines and on other citrus where an all chemical complete fertilizer is applied to acid or basic soils.

Dr. R. W. Ruprecht of the State Experiment Station, gave some very interesting data pertaining to the source of nitrogen plots at Lake Alfred as referred to above. His data showed replaceable bases in the form of calcium oxide, magnesium oxide and potassium oxide for the year 1923 and the year 1934, both in the topsoil and sub-soil in various plots for the years 1923, 1930, 1932, 1934, and 1935. The lime requirement, according to Jones method, was also shown.

The plots receiving bone in the fertilizers had a very definite increase in replaceable lime in 1934, while the other plots just about held their own with the exception of No. 1, which was the nitrate of soda plot, which increased in replaceable lime also.

In replaceable magnesium the differences were not outstanding, but the improved condition of the trees on the bone plots may account for no increase in replaceable magnesium in the soil; and of course it is true that this element is present in very small quantities in the fertilizer materials used.

All the way through there was a noticeable decrease in replaceable potash in 1934 compared with 1933. This actual decrease in replaceable potash over a period of eleven years where the plots had been receiving what would normally be called ample quantities of potash would indicate that there is an actual decrease instead of an accumulation of this element in the soil under these particular conditions. This would also seem to warrant a word of caution to those who are inclined to use rather quick judgment on short term experiments concerning fertilizers for citrus trees. It is quite evident from the data presented that although what would normally be called ample quantitiees of potash have been applied for these eleven years, that there is an actual decrease in replaceable potash in the soil, which in turn axiomatically means that the amount of potash applied must be increased at some time in the future

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Some Field Experiments For The Control Of Melanose And Stem-End Rot Of Citrus

BY WM. A KUNTZ AND GEO D. REUHLE*

Two years ago in the Lake Wales meeting of this Society we presented a progress report on experiments for the control of melanose and stem-end rot. In that paper the need of a combined pruning and spraying program for the control of melanose was suggested and the statement was made that "a certain amount of infection with the melanose fungus, resulting in stem-end rot, takes place in the groves as the fruits are developing". Since that time a great amount of additional data have been accumulated on these problems. From these data we have selected some of the detailed figures obtained from two field experiments, which show the most clear-cut results that we have secured thus far. Results obtained in any field experiments vary from year to year, because of variations in environmental factors and of their effect upon the trees and the melanose fungus. However, these figures will serve to show the trends of results obtained by spraying and pruning for the control of melanose and stem-end rot.

The three phases of the problem that will be considered in this paper are: (1) the relative merits of some of the more common spray materials for the control of melanose fruit blemish, (2) a comparison of pruning and spraying and a combination of the two in a young grapefruit grove for melanose control and (3) the effect of pruning and spraying on the control of stem-end rot in the fruits from this same young grapefruit grove.

One of the experiments was started at Babson Park in 1933. The grove consists of 25-year old grapefruit trees of the "Gold Medal" variety with a few Marsh trees scattered throughout at irregular intervals. The trees have been well fertilized and pruned commercially. This first season some of the copper sprays were compared with some of the sulfur sprays, without the use of oil. A single application of two copper sprays, Bordeaux 1½-2-50 with a spreader, and Coposil 2½ pounds per 100 gallons, was made to two blocks of the trees in early April. At this time the first application of the four variations of the sulfur sprays was made to four other blocks. Following at two-week intervals, two more sulfur sprays were applied to all of the plots, except the unsprayed check. Thus, the trees were sprayed three times in a period of six weeks.

The fruits were examined for the presence of melanose on September 8, 12 and 14 and grouped into five classes according to the number of blemishes per square inch. The percentage of fruits from each spray treatment falling into each class is shown in Table I. The results show that both the half-strength bordeaux and the Coposil were superior to liquid lime-sulfur and liquid lime-sulfur with bentonite sulfur added, especially in the percentage of fruits free of melanose blemish. The colloidal form of sulfur, that is, the Sulfo-Spray, was the least effective in the control of melanose. By considering as first grade the fruits bearing from one to ten lesions per square inch, it may be seen that half-strength bordeaux produced 90 percent, Coposil 84 percent, lime-sulfur with bentonite sulfur 79 percent, lime-sulfur used alone 74 percent of first grade fruits, while the unsprayed checks produced about 53 percent of first grade fruits.

This is purely experimental spraying and, although lime-sulfur, especially with bentonite sulfur added, gave some control of melanose when applied at two-week intervals, the cost of making so many applications seems impractical.

In 1934 the experiment at Babson Park was continued on an expanded scale. That year the spray program was planned so that the time of application of some of the spray materials was varied; a larger number of spray materials was used and a follow-up spray with one percent oil was compared with lime-sulfur for combatting scale. This past year proved

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*Thanks are extended to Mr. O. D. Jaquess of Babson Park and Dr. Robert L. McMullen of Largo for many courtesies and for the use parts of their groves.

TABLE I.—RESULTS OF SPRAYING EXPERIMENTS FOR THE CONTROL OF MELANOSE IN 1933
O. D. JAQUESS GROVE, BABSON PARK, FLA.

Plot No.	Spray Treatment	Dates Applied	No. of Trees in Test	No. of Fruits Examined	Percentages of fruits showing indicated number of melanose lesions per sq. inch. No Lesions	1-10	11-25	26-50	50 Plus
1	(1) Coposil 2.5 lbs. - 100 gallons (2) Lime-sulphur 1-40 (3) Lime-sulphur 1-50	Apr. 7 Apr. 20 May 4	25	967*	21.6	62.8	13.4	1.4	0.8
2	(1) Bordeaux 1½-2-50 plus caseinate (2) Lime-sulfur 1-40 (3) Lime-sulfur 1-50	Apr. 7 Apr. 20 May 4	26	1008	37.8	52.9	8.4	0.7	0.2
3	(1) Sulfo-spray 1-200 (2) Sulfo-spray 1-200 (3) Sulfo-spray 1-200	Apr. 7 Apr. 21 May 5	40	1017	2.5	68.6	23.6	4.1	1.2
4	(1) Sulfo-spray 1-100 (2) Sulfo-spray 1-100 (3) Sulfo-spray 1-100	Apr. 7 Apr. 21 May 5	12	973	5.9	56.5	26.9	8.2	2.5
5	(1) Lime-sulfur 1-40 plus Kolofog 4-100 (2) Lime-sulfur 1-40 plus Kolofog 4-100 (3) Lime-sulfur 1-50 plus Kolofog 4-100	Apr. 6, 7 Apr. 20 May 4, 5	52	1016	14.7	64.7	17.4	2.3	0.9
6	(1) Lime-sulfur 1-40 (2) Lime-sulfur 1-40 (3) Lime-sulfur 1-50	Apr. 6 Apr. 20 May 4	51	1004	5.2	69.2	20.0	4.5	1.1
7	Check - unsprayed		52	1007	1.9	50.8	34.0	9.7	3.6

*Summary of both dropped and hanging fruits. Hanging fruits as reported by L. W. Ziegler.

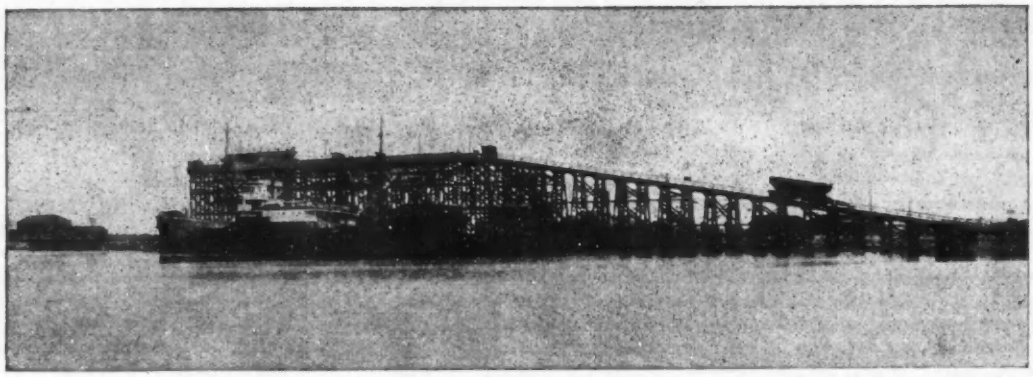

Illustration shows loading S. S. Freeport Sulphur Number Five, with Crude Sulphur at Freeport, Texas.

Control Of Citrus Rust Mite With Sulphur

BY RALPH L. MILLER

ENTOMOLOGIST, FREEPORT SULPHUR CO., NEW ORLEANS, LA.

Because of the large investment and now comparatively small margin of profit in the production of citrus fruit, no grower can afford to produce any but the best possible grades. The margin of profit on the best fruit is so small that if large proportions of second or third grades are produced, the profit is completely wiped out. A further important fact is that the low price at which second and third-grade fruit is sold has the effect of bringing down the price of first-grade fruit.

Market analyses and comparisons of prices with fruit quality show that No. 2 fruit brings 10 percent to 30 percent less gross per box, and that No. 3 usually sells for 40 percent to 50 percent less than does No. 1 fruit. For example, if a grower produces a box of No. 1 fruit which sells for $3.00, his No. 2 fruit will sell for about $2.40 while his No. 3 fruit will have to be sold for about $1.50 per box, quite likely to the itinerant truckster.

If cost of production is $.60 per box, and picking, packing, and freight $1.65, the grower will barely break even on his No. 2 fruit, and lose $.75 a box on his No. 3, but make a profit of $.75 on his No. 1 fruit. Obviously, the greater the proportion of No. 1 fruit produced, the more profit there is for the grower.

Citrus Pests Influence Quality and Quantity

Even when citrus trees are given the best possible care with regard to cultivation and fertilization, some attention must be paid to insect and fungus control in order to produce No. 1 fruit. Fruit that is otherwise perfect may be placed in No. 2 or No. 3 grade because of russeting, which is caused by the presence of only a few rust mites. A crop may be reduced in value 10 percent to 50 percent because of the lack of even one treatment that could have been given for not over two dollars an acre.

Although it is also necessary to control citrus scales and white flies as well as rust mites, fruit quality can probably be most improved for the least money by controlling the citrus rust mite. A program that is based primarily on rust mite control, with the use of whatever other materials are necessary for scale and white fly control, will be most economical. The more nearly the insecticide and fungicide treatments can be fitted to the needs of the citrus trees, the more economical and satisfactory will be the results.

Citrus Rust Mite Causes Severe Losses

Professor J. R. Watson, Entomologist, in Bulletin 67 (1932) of the Florida Agricultural Experiment Station, "Citrus Insects and Their Control," points out that the citrus rust mite attacks the pocket-book of the grower from four directions:

"1. By withdrawing oil and other juices from the leaves and fruit it interferes with their normal growth and functions;

"2. By detracting from the appearance of the fruit and lowering its price;

"3. By reducing the size so that it requires more to fill a box, and increasing the number of culls;

"4. By delaying the coloring of the fruit so that it cannot be marketed early."

Effects of Injury from Rust Mites

The rust mites are an insidious enemy, for because of their very small size and light yellow color they are scarcely visible until present in large numbers. They are then easily recognized by the dusty, powdery appearance of fruit and leaves. Unless a grower is constantly watchful, examining his trees every few days with the aid of a hand lens, considerable damage will have been done before the first control measures are taken. The effects of injury from rust mites are discussed at length by W. W. Yothers and A. C. Mason in Technical Bulletin 176 (1930) published by the Bureau of Entomology, United States Department of Agriculture, entitled "The Citrus Rust Mite and its Control," from which the following summary has been prepared:

(a) The rust mite punctures the rind of the fruit, causing a permanent blemish known in its various stages of severity as "golden," "russet," or "black russet," and on grapefruit as "shark skin." This injury to the rind results in much higher percentages of the lower grades of fruit.

(b) The injury to the rind also stunts growth so that the russet fruit is about 12½ percent smaller than bright fruit.

(c) A short time after russet fruit

has been taken from the trees it becomes wrinkled in appearance, evidently due to excessive evaporation of the water content.

(d) When russet oranges remain on the trees until late spring a large black spot develops on the side exposed to the sun, which renders the fruit unmarketable.

(e) Examination of two hundred selected fruits (one hundred bright and one hundred russet) showed that at the end of one month only 6 percent of the bright fruit had decayed from stem-end rot, while 21 percent of the russet fruit was affected, and after two and one-half months 60 percent of the bright and 87 percent of the russet fruit had decayed from stem-end rot.

(f) Furthermore, the leaves and branches of the citrus tree are seriously injured by rust mite infestation. The devitalization caused by the presence of vast numbers of rust mites on foliage and bark is far greater than the average grower realizes.

Insecticidal Control of Rust Mites

While it has been observed that climatic factors influence the prevalence of rust mites, these conditions must not be relied upon for their control. Insecticides which usually control leaf-eating insects have been found of no value against rust mites. However, they are extremely sensitive to sulphur. Action is believed to be through the fumes for sulphur does not have to be in actual contact with the mites to cause death. The authorities quoted above recommend sulphur in some form as the best agent for effective control.

In choosing a method of control of any pest it is always best to use that material or combination of materials which will give control with the least interference with the normal functions of the tree, provided the cost of the operation is reasonable.

The relative merits of lime-sulphur spraying and sulphur dusting have been discussed for many years, and each method has its particular advantages, but it is generally admitted that dusting is a milder shock to the tree than spraying with any material at all, even water. Although lime-sulphur spray to which wettable sulphur has been added to increase the sulphur strength without danger of burning gives excellent control in early spring for scale, white fly crawlers and rust mite, sulphur dust is much safer for all later applications. Such sulphur dusts give as good control, unless followed too soon by rain, and are much more quickly and cheaply applied than lime-sulphur sprays. Many growers use nothing other than sulphur dusts in their groves from year to year and pack a very high percentage of No. 1 fruit.

Time to Apply Control Measures

Growers who are familiar enough with rust mite occurrence to determine their presence by means of a hand lens can tell exactly when to apply control measures. However, because of the human element involved and because it may not be possible to make examinations frequently enough, most growers would profit by applying sulphur dust at regular intervals in order to make sure that there will always be enough sulphur present to control mites. Such treatment will eliminate the chances of damaged fruit and, although a little more expensive, will be very low cost insurance. For convenience, a control schedule is included in which approximate dates for treatment are given and the kind and amount of materials necessary are designated.

Type of Sulphur Recommended

WETTABLE SULPHURS.—These

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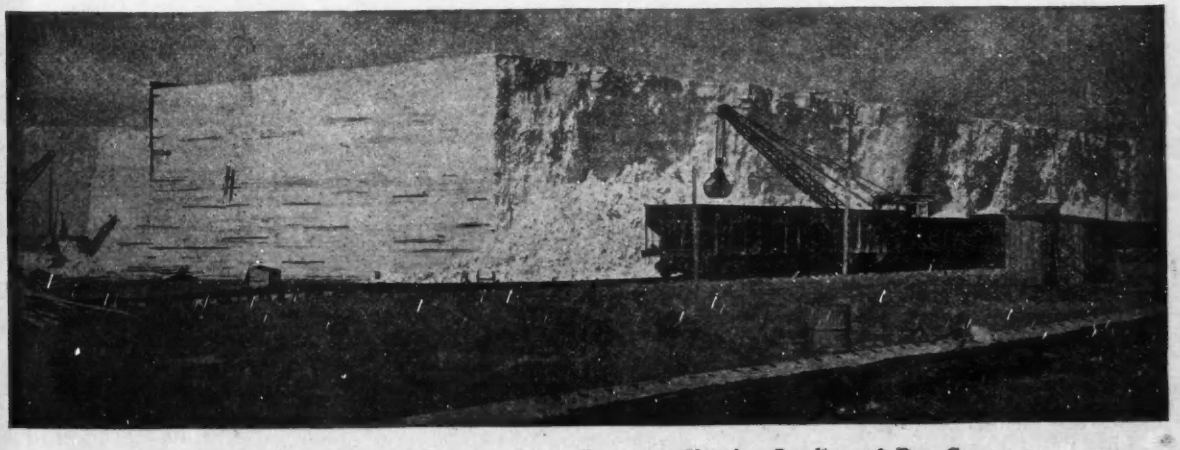
CITRUS PEST CONTROL — AGE AND CONDITION OF TREE

Old Trees With Melanose or Grapefruit With Scab (Satsuma)	TREES WITH YELLOW SPOTS ON LEAVES FROM SCALE	RUST MITE ONLY ALMOST NO YELLOW SPOTS FROM SCALE
Treatment	Treatment	Treatment
February-April Bordeauv 3-3-50 Wettable sulphur 5 lbs. -50 gals.		Sulphur Dust when mites appear ½ lb. to 1 lb. per tree
April 1-15		MAY 15
Lime-sulphur 1 gal.-50 gals. Wett. sulphur 5 lbs.-50 gals.	Lime-sulphur 1 gal.-50 gals. Wett. sulphur 5 lbs.-50 gals.	Sulphur dust ½ lb. to 1 lb. per tree
June 25-July 10 Lime-sulphur 1 gal.-50 gals. Wett. sulphur 5 lbs.-50 gals.	Sulphur dust ½ lb. to 1 lb. per tree	Sulphur dust ½ lb. to 1 lb. per tree
September Sulphur dust ½ lb. to 1 lb. per tree*	Sulphur dust ½ lb. to 1 lb. per tree	Sulphur dust ½ lb. to 1 lb. per tree
November Sulphur dust ½ lb. to 1 lb. per tree	Sulphur dust ½ lb. to 1 lb. per tree	Sulphur dust ½ lb. to 1 lb. per tree
January Sulphur dust ½ lb. to 1 lb. per tree	Sulphur dust ½ lb. to 1 lb. per tree	Sulphur dust ½ lb. to 1 lb. per tree

* Mr. W. W. Yothers of Florida, who perhaps is the best authority on citrus rust mites, states that one half pound is necessary on small trees, while for mature trees one pound is necessary for complete coverage.



Sulphur Vat of the Freeport Sulphur Company, Showing Loading of Box Cars

The Citrus Industry

with which is merged The Citrus Leaf

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Florida Ship Canal (ed.)

THE CROSS-STATE CANAL

The proposed Florida cross-state canal, which if built would bisect the northern half of the Florida citrus belt, has evoked and is evoking much verbal controversy and a great deal of newspaper discussion.

Opponents of the project, which if constructed would cost some hundreds of millions of dollars, protest that the canal is uncalled for, that it would not be used for commercial shipping to any appreciable extent, that it would lower the water level, that it would impregnate the surrounding lands with salt water, and that it might easily reduce large sections of the citrus and trucking areas of the state to the status of a desert. Further, that it would give to the citrus and trucking interests of other regions an outlet at reduced cost to the Atlantic seaboard, now the natural and principal outlet for Florida products.

As to the effect that the construction of the canal might have upon the water level, the ruination of our water supply or the danger of salt water, the writer of this article does not know nor pretend to know. He leaves the discussion of that phase of the project to geologists and pseudo-geologists. Some geologists at least have expressed the opinion that the construction of the canal would seriously affect the water level and threaten the productiveness of the soil.

On one point, however, this writer is thoroughly convinced. Should the canal be constructed, and should it be used to any considerable extent for commercial shipping, it would afford to our competitors in the citrus field a shorter route, a quicker route and a lower rate for their products to Atlantic seabord points and enable them to seriously compete with us in our natural markets where now Florida citrus growers and truckers find their best and most profitable outlet.

This point has been stressed in the "Impressions" column of this publication on numerous occasions ever since the canal project was first mentioned. It has been emphasized by citrus growers and citrus shippers many times. Other objections to the construction of the canal may need the weight of experience to demonstrate their soundness, but there can be no question as to the opportunity which such a canal would afford our competitors in placing their fruit on Eastern markets in shortened time and at lowered cost. There also can be no doubt that those competitors would avail themselves of the opportunity.

With this fact clearly established and with the other objections occupying at least tenable grounds, there is little wonder that the citrus growers and truckers of Florida are uniting in opposition to the project and that pressure is being brought to bear on Washington to sidetrack the project as a useless, if not a dangerous, undertaking which threatens the life of an industry and possibly the productiveness of a state.

Florida Ex. Experiment Station

UNIVERSITY RECEIVES GIFT FOR EXPERIMENT STATION (ed.)

The University of Florida has received the gift of a deed to forty acres of land adjoining the citrus experiment station at Lake Alfred. The land is a gift from the Florida Agricultural Research Institute and was given to the University to enable that institution to enlarge and further develop its experiments in citrus research.

The deed was presented to the University by C. W. Lyons, president of the Research Institute and was received by General A. H. Blanding of the State Board of Control and by President John J. Tigert of the University. Dr. Wilmon Newell, Dean of the College of Agriculture, assured the donors that the additional land provided would be used to the best possible advantage in furthering the research work of the experiment station.

THE OUTLOOK

That Florida's citrus crop now developing on the trees will be far short of last season's enormous output, is the general concensus of opinion. Reports from Texas also indicate a material reduction from previous anticipations in output of grapefruit.

This does not mean that there is any prospect of a serious shortage of citrus, but it does mean that the overwhelming output of last year will be greatly reduced. In this situation, if proper attention is given to the shipment of only fruit of superior quality and if proper control of distribution is exercised, the grower should find a ready market at a profitable price.

CONGRATULATIONS

The Citrus Industry takes pleasure in congratulating Mr. C. T. Melvin, vice-president of the Gulf Fertilizer Co., on his election as president of the National Fertilizer Association. Mr. Melvin had previously served as vice-president of the Association and his elevation to the presidency is a well-earned tribute to his standing in the industry.

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the Safe, Efficient and Economical SUMMER SPRAY for control of CITRUS PESTS

Spray With FLORIDA VOLCK because:

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2. It has a wide margin of *safety* for fruit and foliage.
3. It is an *all-season all-year* spray.
4. It gives real protection for a whole year.
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THE best control of insects is obtainable by application of "Florida VOLCK" during July.

SPRAY NOW! You can get at all insect pest at a time when they are most active, yet most easily killed. You can save fruit that has already become infested.

SPRAY NOW! You can get at all insect pests at use of VOLCK during July, the fruit being neither too small nor too near maturity and coloration. This applies to all varieties.

Spray with VOLCK this summer and reap the benefits that are to be gained from the the use of a safe oil emulsion with a proved record of results.

NITRATE AGENCIES COMPANY

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JACKSONVILLE - - FLORIDA

IMPRESSIONS

..By..
Frank Kay Anderson

One of the recent citrus bills in the legislature which was not widely discussed will now as a law exert considerable effect in reforming former practices. It might be called an act to "aid all and sundry to distinguish between mine and thine," as relating to field boxes. No longer may the old haphazard methods, which permitted the interchange of field boxes between packers by one field crew grabbing up whatever loose boxes it might lay hands upon regardless of whose marks appeared thereon, continue without danger of incurring penalty of the law. Nor will it be safe to erase or mutilate marks upon such field boxes. Field boxes now belong to those whose marks appear upon them, and those found in possession of boxes with markings not their own may find themselves in embarassing positions.

When Chester C. Fosgate, the well known shipper of Orlando and Forest City, was a small boy he craved a little red wagon. For some reason his craving was denied. Now, however, he has plenty of red wagons and ought at last to be happy. That brilliant coloring of Chester Fosgate's new trucks and cars may be spotted from afar; and it's so red that an ordinary fire engine by comparison looks to be a pale pink.

Hats off to the young sons of Dave Fishback and the late S. H. Aatha of Orlando for the part they played recently in discouraging fruit stealing. Persistent pilferage in the Fishback grove near Maitland prompted the owner to induce the young fellows to go on watch there at night. One night a truck carrying two negroes drove right into the grove; and, the negroes showing signs of fight upon being hailed, young Fishback and Atha peppered them with shot, and then turned them over to the officers.

This fruit stealing is in some sections of the state a very well organized racket. So well organized that one young fellow this past winter received a definite offer of six dollars per night wages to engage in it under the direction of one who claimed it was his regular business. This was duly reported to the authorities, but no arrests followed. True one member of the "firm" making the offer now languishes in confinement for burglary of other things; but another member still being at large details are omitted here in the hope that next season the law's luck may be better and he may be caught.

One of Florida's real pioneer women citrus growers has passed with the death recently at City Point in Brevard county of Mrs. Susan Chancey 92 years old, a resident there for 61 years. Born in West Florida, Mrs. Chancey came to City Point in 1874 with her husband who died there not long afterward. With a family to provide for, she planted some of the earliest citrus groves in Brevard county, and for many years was very successful in citrus culture. Due to ill health, she had not been active in recent years, but was well loved in her community.

And Henry C. Merrill of Tropic on Merritt Island has passed. A business man of Kansas City, he inherited from his father the family winter home on lower Merritt Island, Tropic Home, that long has been one of the show places of that section. Here, upon retirement from active business in Kansas City some years ago, he gave his attention to growing citrus and was for many years actively known in that connection. For a period he served upon the board of directors of the Florida Citrus Exchange, representing the Indian River, and in that capacity made a wide circle of friends among Florida citrus people through his constructiveness and forthrightness coupled with a most pleasant personality.

The death at Tampa of Judge William Hunter removes Florida's foremost citrus legal figure, widely known to the industry. Judge Hunter came to Tampa from Memphis 53 years ago, when Tampa was but a wide spot in the road, and his record of practice at the Florida bar, during which time he served for a period as its president, probably was not exceeded by any other man. From the inception of the Florida Citrus Exchange to the time of his death he served as its chief counsel. He aided to draw the charter and by-laws which made the organization possible, and over this long period of years was its legal watchdog. In the course of that time he made many friends in citrus circles; and was highly esteemed. There are many who will feel, along with this writer, that in the death of Judge William Hunter they have lost a valued friend.

During his later years Judge Hunter had the repute of being perhaps Florida's foremost constitutional lawyer. Certainly he knew the Florida constitution and the court decisions bearing thereon as few others did. We recall with gratitude an incident of his extensive knowledge. Years ago we had a legal matter of some importance to us coming up in court in an inland county. Judge Hunter, Frank Skelly and this writer at that time had the habit of lunching together at a certain table at a Tampa restaurant. Naturally the subject of this case came in for mention there. The day before it was to come to trial Judge Hunter handed us a scrap of paper, saying it was supreme court citation which might have some bearing on the case. Next day we went to bat at the inland county seat. We were represented by perhaps the leading local law firm. They came into action with two or three wheelbarrow-loads of law books and citations, so did the opposition. We turned over Judge Hunter's memo, and they sent back for still another book. It was a long and wordy battle; but in the end the case was won by the single citation which Judge Hunter had furnished. It fitted the case in question like a glove. All the other ammunition of both arrays of legal talent was disregarded by the court. Naturally enough we had long held high opinion of Judge Hunter's ability, in addition to our high regard for him as a man.

And W. W. (Pete) Yothers of Orlando after thirty years active service has gone upon the retired list of the Bureau of Entomology of the U. S. D. A., but can the Orlando

federal citrus experiment station be the same without him? For the past 27 years he has been at Orlando, delving into citrus bugology and has come to be regarded as just about as much a Florida citrus institution as pruning shears or the standard box. One of the country's foremost practical entomologists, he simply took root in Florida and sentiment in Florida prohibited his transfer by the Bureau to any other field. His work in developing oil emulsions for pest control has been an outstanding feature of his long and most useful career in Florida; and his long and detailed study of the rust mite, the peskiest of all Florida citrus pests, while of tremendous value to Florida citrus growers, served also to make him one of the great authorities on the subject in the world of entomology. One of the most painstaking and conscientious researchers, his recommendations as given to the growers from time to time have been noted for their preciseness and practical nature, for he, among other things, came to be a citrus grower himself and was an eminently practical person. He has served upon the board of the Plymouth Citrus Growers Assn., near whose packing house his own grove is located. Likewise he has served most usefully upon the board of the Orange County sub-exchange, and upon the board of the Florida Citrus Exchange. He has tried to do his part for Florida and the citrus industry in every othe way, while continuously serving at the federal experiment station in his specialized capacity. He is abundantly entitled to a layoff, if any of Uncle Sam's agricultural workers are; but for the rank and file of Florida citrus growers the federal citrus experiment station at Orlando isn't hereafter going to be quite the same place without his outspoken and forthright personality around the grounds.

Another of the pioneers among the modern citrus growers has passed with the death at Leesburg recently of Jesse L. Stallings, for the past fifty years a resident of that section. Long engaged in citrus culture, Mr. Stallings rated among Lake county's most successful growers; and at the time of his death his grove holdings were said to be among the largest of those of any individual in Lake County.

Smart action we calls it; that of Lawrence Gentile, Tony Young and their associates in naming their new cooperative citrus marketing agency "Tree-Gold Cooperative Growers," and thus from the first tying their selected trademark into the name of the organization. In both the commercial and the cooperative world there have been instances of concerns whose trademarked products so eclipsed in fame the names of the concerns themselves that it was found advisable to change the names of the concerns to conform to the trademark nomenclature; but that came later and there was a lot of lost motion in the process. We recall, among other instances, that originally it was the American Cereal Co. which manufactured Quaker Oats. With the passage of time Quaker Oats became so well known to the public that only a comparative few knew the American Cereal Co., so it was found advisable to change the corporate name to Quaker Oats Co., which it remains today. Then there was the S. C. Johnson Soap Co. that came to bat from Milwaukee with a soap that they called Palmolive. Later that Palmolive trademrk so overshadowed the name of the parent concern that it became policy to change the corporate name to that of the Palmolive Company, which later was merged with Colgate and other concerns into the giant company of the present. Somewhat the same story with Sunmaid Raisin Growers and some other cooperatives. It appeals to us as smart to tie into the trademark name right from the first.

Quite a line-up the new cooperative presents with Sen. A. W. (Tony) Young of Vero Beach as president (non-salaried job); Lawrence Gentile as vice-president and general manager; O. G. Strauss, assistant general manager; Joseph Gentile Jr., general sales manager; A. W. McKay, recently resigned from the USDA and the AAA after many years service, treasurer; A. R. Davenport, general auditor; and H. C. Gettier in charge of traffic. The first board of directors consists of A. W. Young, Lawrence Gentile, Hudson J. McReynolds of Orlando, Joseph Gentile Jr., and J. G. Dreka of DeLand.

Announced determination of state forces to construct at various places over the state a series of farmers' wholesale markets, similar to that opened in Sanford last December and operated since is about what might have been expected from the widspread dissemination of news of the success of the Sanford project in its early beginnings. However, developments at the Sanford market more recently have been responsible for reports that sentiment of the farmers of the vicinity is to the effect that after the novelty of the institution had worn off it fairly soon ceased to be a true farmers' market. All the time worn charges against middlemen by farmers recently have been made in the Sanford vicinty. That does not mean that the market is a failure from the standpoint of the farmers; but evidently it is going to require more than a single season to determine its real functions and usefulness to the producers.

Up in the cotton belt much stirring about over the importations into the U.S.A. of China-grown cottonseed. Pennsylvania's pure fertilizer and feed law is credited with discovery of the Chinese origin of some of the cottonseed shipped to farmers in that state. Then tracing back the cotton growers discovered the heavy importations had been made by an Atlanta concern which customarily sells fertilizer materials to the mixing plants over the South. Recent quantity importations of Argentine beef and Danish butter created a big stir in northern agricultural circles, but largely left the South unmoved. Now the more recent discovery that Chi-

(Continued on page 17)

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Citrus Growing In Indian River County

HARRY S. JONES, VERO BEACH, FLORIDA

AT MEETING OF FLORIDA STATE HORTICULTURAL SOCIETY

The exact date of the first citrus plantings in this county is not definitely known. It is a fact, however, that there were bearing orange trees at what is known as Barker's Bluff as early as 1883. This bluff is a relatively high point on the west bank of the Indian River and on the south bank of the Sebastian River, about fifteen miles north of here and near the present town of Roseland. At this point a Mr. Barker for whom the bluff was named ran an Indian trading post previous to 1883. He had undoubtedly planted some sweet orange seed and these became the first sweet orange trees in Indian River county.

Mr. Frank Forster made the first planting on the island, that is, on the east shore of the Indian River and about nine miles north of here, in 1883, and Mr. Michael, father of Mr. A. B. Michael of the American Fruit Growers, planted some grove at this same location in 1887. Nearly all of these early plantings on the island were killed by salt water in a severe tropical storm in the fall of 1893. A few trees, however, survived this salt water bath and were only slightly damaged by the freeze of 1894-95. The coldest temperature experienced on the island since 1883 was on December 30, 1894, when the temperature went down to 26 degrees.

The earliest plantings in the immediate vicinity of Vero Beach were made by Mr. Gifford, father of Charles Gifford, one of our present successful growers. These plantings were made in 1890 and were well within the present city limits, in fact only about three blocks from this building in which we are now assembled. Some of these trees are still living and still bearing. They were hurt some by the freeze of 1894-5 and in 1896 produced no fruit. That is the only year in forty-five years that these trees have missed bearing a crop. In the early nineties the West Grove and the Helseth groves were planted on the sand ridge four to five miles south of this city. About this same time, Mr. Eli Walker planted a grove in a high hammock about three miles west of the city.

Previous to the freeze of 1894-5, prices for oranges and grapefruit were not particularly high, one dollar per box on the tree being the usual price. After the freeze, however, prices advanced considerably and Mr. Gifford relates that many a box of grapefruit was sold on the tree for two dollars per box. This was before the day of standardized containers and each grower was quite at liberty to make boxes that suited his own ideas as to capacity. What with grapefruit bringing two dollars per box on the tree and boxes of a size to suit the grower, those were the good old days.

These early plantings which certainly did not exceed 100 acres were pretty generally located where there was good natural drainage into the Indian River. To the west of these naturally drained locations lay several thousand acres of good land, but low and flat, with a high water table and no natural drainage.

It was long realized that before this land could be utilized and our back country developed, artificial drainage must be provided. Accordingly a drainage district was planned and a company known as the Indian River Farms Company, was organized by Mr. Herman J. Zeuch in 1912 to carry out the plans for draining this territory. Money and equipment was provided to drain 48,000 acres. A ditch was dug on the North West and South sides of this entire area, with the spoil bank forming a dyke of sufficient height to keep out the surface water from the surrounding territory. A total of 480 miles of large and small canals was dug within the district.

Briefly the system of drainage is this; three large canals are connected by lateral canals running east and west and one-half mile part. Into these sub-laterals the private farm and grove ditches empty their excess water. This has given this entire area excellent drainage. The management and control of this drainage district is vested in a board of supervisors elected by the land owners of the district. This board has charge of the maintenance of these canals, laterals and sub-laterals and for this service the land owners pay approximately fifty cents per acre per year.

Following the completion of this drainage system in 1914 the business of producing grapefruit and oranges expanded rapidly until we now have some 8,800 acres devoted to the growing of citrus fruit. This acreage and the fruit produced therefrom enables this county to rank thirteenth among the thirty-five citrus pruducing counties in the state.

Sixty - eight per cent of our 8-800 acres are devoted to the growing of oranges and the balance to grapefruit and tangerines. Of the oranges approximately ninety percent are divided about equally between Pineapple oranges and Valencias. The balance is made up of Parson Browns, Hamlins, Connors seedless, Jaffas, Temples, Kings and a few seedlings. At the present time the bearing grapefruit trees are divided about equally between Duncan and Marsh Seedless. In recent years the plantings of grapefruit trees have been almost entirely of Marsh Seedless. There is a noticeable tendency in recent plantings to plant more heavily to Hamlins and some growers have recently planted a few pink grapefruit.

Trees within the drainage district are all planted on beds or ridges. This bedding of the land is accomplished, of course, by plowing in such a way as to throw the furrows together forming a ridge. Two or three plowings are usually required to get this ridge to the proper elevation. Then mounds are built on top of this ridge where each individual tree is to be set. These mounds vary from three to four feet in diameter and are made six to twelve inches higher than the ridge, dependent upon how high the grower thinks it necessary to set his trees. For the next two or three years additional plowings are made, the dirt being thrown to the mounds so that the final result is a gradual slope from the crown roots of the tree to the water-furrows between the beds. These water-furrows serve a double purpose. Not only do they aid in

carrying off the surface water from the grove, but they serve as distributing channels when irrigation is resorted to.

The width of the beds on which our trees are planted varies all the way from 20 to 40 feet dependent in the past upon what distance suited best the fancy of each individual grower. It is becoming quite the standard practice now, however, to plant orange trees on 25-foot beds and 20 feet apart in the row, grapefruit trees on 30-foot beds and 25 feet apart in the row. These distances allow ample room between the rows for the use of all kinds of grove equipment, provide sufficient space for the trees to reach maturity without crowding and permit setting about 85 orange trees or 55 grapefruit trees to the acre.

In recent years the practice of planting trees in so-called double bed has become quite popular. These double beds have a water-furrow only every 50 feet where oranges are planted, and only every 60 feet in the case of grapefruit. It is the contention of those who favor the double bed that this method provides a greater area of surface soil for the feeder roots, that the double bed will not dry out as quickly as the single bed, and that the middle where there is no water-furrow provides a much better roadway for the sprayer, for hauling fertilizer into the grove, and for hauling out fruit than is the case with the single bed where there is a water-furrow in every middle.

One of the most valuable assets from a grower's point of view, of which this section can boast, is its abundant supply of artesian water. This water is obtained by drilling to a depth of 500 to 600 feet. One four-inch well drilled to this depth, at a cost of about $450 dollars, if correctly located, will furnish sufficient water for irrigating a forty-acre grove. With such a well properly located and the water correctly distributed, no tree in any grove need ever have a wilted leaf. This water is good for every purpose for which man could possibly use it. It is good for humans to drink. From the standpoint of being uncontaminated it is, of course, extremely pure. It is good for livestock and good for irrigating the grove. It is perfectly satisfactory to use with every kind of spray material used in a grove. There is one exception to this. There is one kind of spray material, a mercurial compound, in which the artesian water is not suitable, but we get around that by not using this material.

This water is alkaline in its reaction and contains a relatively high amount of minerals. These wells have sufficient pressure to operate a small generator which will furnish electricity for the farm house and farm buildings, and sufficient pressure to operate a stand pipe for filling the spray tank so that pumps or other filling devices are unnecessary. The most amazing thing about this Artesian water is its apparently inexhaustible supply. In one recent summer we experienced a drought of about ninety days duration. During this time it is safe to assume that every well in the Indian River district (and there must be thousands of them) was wide open and yet none of them stopped flowing because of a lack of water. Toward the end of this period there was a slight decrease in the flow but the amount of water being obtained was still ample.

With such a supply of water as this, irrigating a grove is a relatively simple matter. At least each twenty-acre block of trees is surrounded by ditches which of course, aid in draining the grove. When it is desired to irrigate, the outlets to these ditches are closed and the ditches filled with water. From these ditches the water flows into all parts of the grove by means of the water furrows already described. Irrigating a grove is largely a matter of opening a four-inch valve. This is neither laborious nor expensive. There is no

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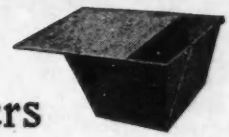

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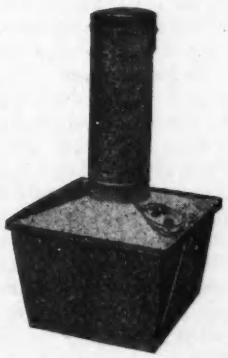

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Strangers seeing our groves for the first time often ask why we do not disc and prevent the growth of grass and weeds in our groves. The answer is, we want the grass and weeds. Frequent mowing of this growth and permitting it to lay on the ground where it rapidly decays means that we are continually renewing the supply of humus in the soil. A soil well supplied with humus is always a well aerated soil. It is not nearly so apt to become waterlogged at the time of excessive rains, nor does it dry out as rapidly in dry weather as does soil that is devoid of humus. Furthermore, this carpet of vegetation forms a protective blanket during hot weather for the feeder roots of the trees which are very close to the surface. The growing of the grass and weeds is an excellent method of removing during heavy rains, a large portion of the excess surface moisture.

It is often asserted by those unfamiliar with our methods that a great deal of our fertilizer goes to growing grass and weeds. That is true but so long as we mow frequently we are converting this fertilizer into a form most readily assimilated by the trees — decayed vegetation. I would call your attention also to the fact that there is very little leaching of the nitrogen in the decayed vegetation as compared to the heavy leaching of nitrogen when applied in the mineral form. To get the maximum results from our fertilizer and from our vegetation it is essential that we mow often enough to get the greatest amount of growth. Let me explain this by saying that after grass and weeds reach maturity no further growth takes place, whereas there is immediate growth after each mowing. Then too there is very little value in vegetation that has been allowed to die standing up, but grass and weeds that are mowed while green and succulent are high in plant food.

There is one more advantage to mowing frequently. Green and growing grass will not support combustion, but grass and weeds that have been allowed to mature and die standing up are excellent fuel for a fire and will furnish sufficient heat to completely destroy a fruit tree. One method of attempting to keep fires out of groves is to keep a fireguard around the grove disced clean of all vegetation. It is claimed by some that this is of little value, except as a place to start a backfire, as in a high wind burning embers are carried over the fireguard and into the grove. But if the burning ember falls in green grass it will not last long. It is possible to find groves in this section that have been kept well mowed and in which there has been no damage from fire in the past ten years.

The question of keeping down to a minimum the damage from fire is in a fair way of being answered now, so far as this community is concerned. A fire protective association of grove owners has recently been formed, fire fighting equipment has been purchased and this equipment is available to any grove owner who has contributed to the cost of the apparatus.

Fertilizing, here as elsewhere, is done by about as many methods as there are growers and the surprising thing is that all of these methods work so well. If we knew exactly how to fertilize we might grow two oranges where only one grows now, but what would we do with the other orange? Fertilizing in this section differs from that of other sections probably in only two particulars; the low percent of ammonia in our mixtures and the small amount used. In many groves, grapefruit trees 15 to 20 years old receive in a year not more than 25 pounds of fertilizer containing only 2 or 3 percent ammonia. These trees bear well every year and almost never show any signs of nitrogen deficiency. One grove containing a 10-acre block of 825 11-year old Valencia trees has this year produced 4,703 field boxes of oranges. This is the fourth consecutive year that these trees have produced a good crop and yet they have never received more than 16 pounds of a 3-8-8 fertilizer per year. That is exactly what they were given this past year and they have had no fertilizer since November. Yet after carrying this heavy load they show no signs of insufficient feeding.

There are four samples of soil on display here which are representative of our best citrus land. No. 1 is a sample of our heavy hammock soil having a dark, rich top soil containing a large amount of decayed vegetation. Underneath this is a layer of marl and clay and still further down is deposit of shell and marl. The lime in this marl is in the carbonate form and since these particles are finely divided this lime is quite readily available. The shells are also carbonate of lime but since these particles are coarse this is only slowly available. This subsoil, with its marl, clay and shell is the chief characteristic of the Indian River District and is the basis for setting legal and geographical limits to this section bearing the Indian River name. No. 2 sample shows a top soil of fine gray sand with a layer of yellow sand underneath. Further down at a depth of about 3 feet is a deposit of blue clay. No. 3 is from the Island east of Wabasso where Mr. Michael grows such fine grapefruit. No. 4 is a sample of the soil in the Oslo Hammock where Mr. Texton grows his prize winning oranges and grapefruit.

There are places in this section where this marl subsoil is so close to the surface that it becomes a top soil. Trees growing or trying to grow in these spots get into a lot of trouble. They french badly, dead wood develops rapidly, and a condition of almost permanent dormancy develops. There is very little new growth and almost no bloom. Happily, however, a solution to this problem has been found. The work of the Experiment Station with Manganese in the tomato growing section of Dade County where the soil is of a calcareous nature gave us some good ideas. At first the results of using Manganese in these marl areas were rather discouraging. Experiments were then tried using much larger amounts than formerly and this gave the answer we sought, when applied to grapefruit trees. 15 pounds of Manganese Sulphate applied in 3 applications of 5 pounds each over a period of one year will actually make a grapefruit tree go to work. In 18 months after the first application the frenching will almost entirely disappear. Dead wood will cease showing up, the tree will put on a rich green color and a heavy bloom. With orange trees growing on these out croppings of marl, the Manganese produced no outstanding results. However, Dr. Camp's work with Zinc Sulphate on Tung Oil trees and his experiment of spraying badly frenched orange trees with Zinc Sulphate and Lime Sulphur gave us another idea. After listening to Dr. Camp's discussion of the use of Zinc Sulphate at the meeting of this society last year in Orlando, we came home and sprayed a group of badly frenched orange trees which had persistently refused to respond to Manganese, or Blue Stone or Copperas. These trees were sprayed with 5 pounds of Zinc Sulphate and one gallon of Lime Sulphur to each 50 gallons of water. We repeated this spray last January and today these trees show almost no signs of frenching, they have taken on a good rich green

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IMPRESSIONS

(Continued from page 13)

nese cottonseed have been coming into the South in quantity has served to arouse a good part of the cotton belt into a state of indignation.

From Washington comes a comforting thought, from the bureau of entomology of the U. S. D. A. Long and careful study of the subject is said to reveal that it isn't so easy for a bee to sting; that the action requires both effort and concentration. There are three distinct movements of the stinger, according to the authorities, and these require the coordinated action of twenty-two of the bee's muscles. The stinging apparatus is one of the bee's accessory sex glands. So next time a bee sits down on you just pause and reflect that it required real effort on the bee's part and was no mere accident; and take comfort in your sex appeal.

Lake Mary, Florida, progressive small town not far from Sanford, recently rose in its might and through resolution of its chamber of commerce, adopted in an open meeting with a large number of its citizens present, delivered itself of the following: "Resolved: That after two years experience with and observation of the FERA and other relief agencies, we *** believe that the said FERA in helping able-bodied men is destroying their morale and their usefulness as citizens. We therefore beg of the FERA that it discontinue all direct or indirect relief to the men of the Lake Mary district who are able to work, and to anyone who is supporting able-bodied men who refuse to work."

Fame comes to some in one manner, and to others in another. Witness the following from the editorial comment in a recent issue of the Orlando Reporter-Star: "The human scalp has 1,000 hairs to the square inch. This will enable you to visualize the number of hairs Bill Mouser has given up." The price of brains, eh?

Howard G. Putnam, the sage of Oak Hill, back upon the board of directors of the Florida Citrus Exchange to represent the East Coast growers; and once more dignified as the vice-president of that organization. A strong man always in citrus, Howard Putnam was a strong man upon the Exchange board in his earlier incumbency and made a wide circle of friends among the growers from other sections that he contacted while thus serving. The former Volusia county senator normally hasn't a great deal to say, but what he says usually is plenty to the point.

Good news from Fort Myers in the report that the Lee County Packing Co. will fully rebuild their fine $100,000 packing house recently destroyed by fire; and that the new plant with the addition of some of the newest wrinkles will be ready for service when the next shipping season opens.

For a long time we have been wanting to see more of H. L. Baskin of Orlando, the guy who admits that ten per cent potash will not do citrus trees any harm, then the other day we rose up from the water in which we were swimming and saw plenty of him. In the first place there is more of him than appears when he is fully clothed; and in the second place his swimming attire is just a little short of what once was esteemed the minimum necessary to flag a bicycle. For the edification of those who doubtless will want to know, we are glad to report that he does not smoke that pipe while in swimming.

At that we didn't see nearly so much of the Baskin person as we did recently of another, when a man-mountain rose suddenly out of the water a bit ahead of us, and, lo, it was J. E. (Jack) Stewart of Gentile Bros. He must have been what the

(Continued on next page)

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The Importance Of Soil Organic Matter

DR. R. M. BARNETTE, SOILS CHEMIST
FLORIDA AGRICULTURAL EXPERIMENT STATION

All living things require some source of energy, or food. The soil does not differ from other living things in this respect. In the soil the main sources of energy for life are primarily the organic materials supplied to it in the form of cover crops, appropriate fertilizing materials and animal manures. These materials furnish the necessary sources of energy for the life of the soil—for the activities of the numerous small plants—called beneficial soil microorganisms which are so essential for a fertile soil.

With animals and with plants the ideas of nutrition have long since ceased to be centered around the sources of energy alone. The importance of vitamines and of the mineral metabolism in animal nutrition is abundantly emphasized in present day diets for humans and localized food supplements for farm and range animals. This has led to a study of the correlations between plant, animal and finally, shall we say, soil nutrition. This widened viewpoint has many ramifications but essentially it places the question of the management and utilization of soils on a different basis than formerly recognized. In other words, the nutrition must be considered not only on the basis of a readily available supply of formerly recognized sources of energy, but also from the basis of the more intimate and essential relationship of the plant and the soil. This relationship has an application in every soil-plant association; that is to say, in rotations of crops and use of fertilizing materials. The economic aspects of the question must be properly evaluated for different cultures and sections of the State. More specific examples will make clearer this interrelationship between plants and soils, and also the importance of considering other factors than those ordinarily considered in plant nutrition and soil nutrition.

By carefully controlled experiments it has been determined that cover crops are of very great importance in the turn-over of many plant nutrients. Nitrogen, potassium, calcium and other plant nutrients are taken up by the cover crop and returned in an available form to the crop following it. This is an extremely important factor in sandy soils. These plant nutrients contained in cover crops are made slowly available to plants and thus insure a balanced ration for the growing crop. Experimental evidence indicates that the inorganic constituents in the cover crop may influence the composition of rough lemon seedlings grown in their presence if abundant supplies of the cover crops are furnished to the growing plant. These results suggest the possible influence of the source of organic matter on the availability of some of the so-called secondary plant nutrients. Evidently crude organic sources of ammonia are especially good purveyors of some of these less common elements and, therefore, their popularity in general grove fertilization practices on sandy soils.

In the general farming area of the State, particularly on sandy soils, "land resting" is a common practice. Preliminary carefully controlled experiments, "land resting" or permitting the land to grow up to volunteer weeds and grasses for a year, has proved to be distinctly beneficial.

"White bud" of corn, a definitely defined physiological disturbance of the corn plant has been largely overcome by "land resting" practice. This malnutrition of corn has also been definitely alleviated by the application of chemically pure zinc sulphate. Thus "resting the land" has mobilized sufficient zinc to overcome what would in a continuously cultivated soil be a zinc deficiency in the broadest sense of the word. These preliminary results emphasize the quality factor as well as the quantity factor in the evaluation of organic matter to be returned to the soil. They show that sources of energy for soil microorganisms cannot be impartially accepted, but must be evaluated on a broader, more comprehensive basis. Thus, the significance of soil organic matter assumes greater importance regardless of the source; cover crops, appropriate fertilizers or animal manures.

IMPRESSIONS

(Continued from preceding page)

fellow was thinking about who coined the phrase about the man who was big enough to go bear hunting with his fists.

You don't see nearly so much of Lou Jacobs, the Ocoee shipping factotum, under similar conditions. There's more swimming suit and less Lou; but anyway Lou insists that personally he runs mostly to quality.

This may be the place to close this month's contribution to the mental uplift, for no writing man with an eye for the future can afford to deal with the unclothed truth.

CITRUS GROWING IN INDIAN RIVER COUNTY

(Continued from page 16)

color, and this spring put out a heavy bloom.

You will not want me to stop, I am sure, until I have told you something of the effects of last December's cold spell. A state wide survey of the cold damage made by the Florida Emergency Relief Administration, cooperating with the Citrus Control Committee, showed that this county suffered no loss of growth to its bearing trees, that non-bearing trees suffered a 5% loss of leaves and growth and that the fruit damage was: Tangerines 20%, Oranges 3% and Grapefruit 0%.

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SUMMER FERTILIZING FOR GROVES

(Continued from Page 6)

to prevent starvation of the trees for this essential element.

Interesting Figures on pH of Soil in Plots

The data presented shows that in the plots receiving enough bone meal in their fertilizers to provide all the phosphoric acid with attending quantities of ammonia, there was a drop in pH value of about .5 from 1923 to 1935; and that the same was true of the plot receiving all its nitrogen from nitrate of soda in the fertilizer mixture. At the same time the other plots showed a drop in pH value of about 1.0 and in fact plot No. 2 (Sulphate of Ammonia) had a drop of approximately 1.22 in the same period, that is from 1923 to 1935.

The pH values of the plots receiving bone ran 5.22, 5.25, 5.11 and 5.22 in the 1935 tests; the soda plot ran 5.06; the sulphate plot 4.62; the blood plot 4.70 and the combination plot 4.68.

The replaceable lime on these same plots in the same order in 1934 ran .039, .030, .035, .042, .030, .018, .018, .019. It would seem that the pH value and the replaceable lime followed each other quite closely in these plots; and another interesting point is that even the best plots have only a very moderate pH (averaging about 5.22) and a rather small percentage of replaceable lime. lime. Please remember these figures show conditions existing under certain experimental conditions; they are not offered as recommendations or a statement of what is "best."

In this particular connection however, it should be remembered that these plots have been fertilized three times per year, which might indicate that if groves are regularly and sufficiently fertilized with well balanced mixtures, normal requirements of trees and soils may be cared for, without any attempt being made to create large surpluses or without running into possible exhaustion or deficiencies which in turn would cause tree or crop troubles, or necessitate the expense of making large applications of various materials or mixtures for corrective purposes. In other words this would tend to point towards the soundness of old style fertilizer practice as pertains to these special points.

Summing up the evidence at hand it would seem that on the acid, sandy soils which form so much of the State, that old line, single strength,

(Continued on Page 26)

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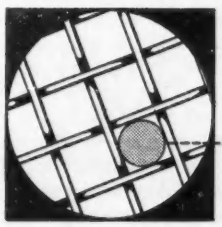

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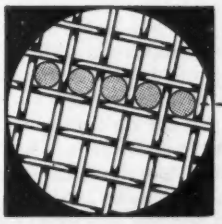

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When Citrus Canker Menaced Florida

FUNDS FOR ERADICATION WERE OBTAINABLE ONLY AFTER STRENUOUS ENDEAVOR BY INDUSTRY LEADERS

BY JEFFERSON THOMAS

Twenty years ago citrus canker menaced Florida and threatened the destruction of her grapefruit and orange groves. Funds for the eradication of the disease were obtained from the state and federal treasuries only after the most strenuous endeavor on the part of industry leaders. Overcoming difficulties that frequently seemed to be insurmountable, they persisted in the effort which constitutes one of the most interesting chapters in the history of Florida fruit growing.

In the early part of the past May, Hon. A. Frank Lever, now associated with the Federal Farm Credit Administration, delivered a series of seven radio talks over Station WRUF at Gainesville, four of them during the regular noonday Florida Farm Hour and three in the evening. Description of the service rendered to rural people by this distinguished South Carolinian is writ large in the record of agricultural extension work.

Representative in congress from his native state at the age of 26 years, Mr. Lever had a lengthy and honorable career in that capacity. As chairman of the powerful lower house committee on agriculture in 1914, he was co-author with the late great Hoke Smith, United States senator from Georgia, of the bill establishing the extension service on a cooperative basis.

Friendship for Florida was displayed by the South Carolina congressman in connection with the federal appropriations for citrus canker eradication. Since the writer apparently is the only employe of the Gainesville state farm service agencies old enough to recall the circumstances, preparation of a tribute to Mr. Lever was made one of his duties.

Facts developed in the recital over radio of the conditions confronting Florida growers in the canker crisis, as illustrating the value of the help extended by Mr. Lever in securing funds from Washington, possibly will be of interest to Citrus Industry readers. They deserve a prominent place in the archives which preserve the story of the period.

Beginning of the Fight

Information as to citrus canker was scarce when the first infections in Florida were discovered and some time elapsed before growers came to realize that a vigorous fight would be required in freeing the state from the disease. In the beginnings of the attempt, contributions from private sources financed the effort. Thousands of dollars were raised and expended before the full significance of the situation was recognized.

When it became evident that the task would require more money than could be derived from the subscriptions of individuals and corporations, plans were made for seeking government funds. Developments also had disclosed the need for official direction of the battle against the disease. Organization then was perfected for making appeals to the state legislature and to the federal congress.

Leadership in the citrus industry was exercised at the time by a group of determined and far-sighted men. They pulled together during the early stages of the combat with canker in a spirit of unity seldom if ever duplicated since the citrus industry of Florida was launched. Scores of these growers and shippers gave liberally in both money and time, and their determinatoin was inspiring.

Selection was made with practical unanimity of D. Collins Gillett, Tampa, as working chief of the committees chosen to prosecute the requests for aid from Tallahassee and Washington. Diligently and efficiently Mr. Gillett carried on until success had crowned the endeavor. Service of a more outstanding nature never was rendered by an individual to an industry.

Tribute to Mr. Gillett expressing the deep obligation of grapefruit and orange producers was gracefully paid, following his untimely death during the fall of 1933, in a letter to the Tampa Morning Tribune, written by L. B. Skinner, extensive grove owner of Pinellas county, who himself was a tower of strength in the canker fight.

Energy of the unremitting type was applied to the problem by Mr. Gillett, who disclosed the possession of great political skill and displayed a high order of ability as the ambassador of Florida citrus interests at the capitals of the state and the nation.

Holding up the hands of Gillett were scores of faithful lieutenants. Wartmann, Temple, Tabor, Ross, Krome, Jones and scores of others who were among them also have been called hence. Burton, the Chases, Hume, Skinner, Stewart, Taylor and many more survive.

Organizing of the Forces

Resources of the Florida Agricultural Extension Service were freely placed at the disposal of the canker-fighting forces. Neither institution had attained the size or the strength of the present, however, nor had either the legal authority necessary to effective eradication effort. In consequence, the 1915 legislature was induced to pass bills for a horticultural law known as the Florida plant act, then an innovation in the field.

Created by this legislation was the State Plant Board, empowered to take necessary steps for the protection of horticulture. Precautions against political control of the agency were covered in a provision that its membership should be the same as that of the State Board of Control, charged with responsibility for the institutions of higher learning. (In 1927 a revised plant act was adopted, and Mediterranean fruit fly eradication later was accomplished under it.)

Appropriations for the conduct of the campaign against citrus canker also were made in the 1915 legislative session. Park Trammell was governor; senators and representatives who assisted in getting the money included Fred M. Hudson, Cary A. Hardee, Ion L. Farris and Herbert J. Drane. Expenditures of state funds to April 30, 1916 had aggregated about $110,000. Growers and ship-

pers furnished the State Plant Board almost as much money.

As the extent and intensity of the infestations became better understood, it was clearly evident that Florida alone could not supply cash enough to win the battle. Federal aid accordingly was sought and in securing it the genius of Gillett evidenced both versatility and force. Assistance was forthcoming from many directions, in some cases the support having been altogether unexpected.

Leave of absence for one of his most capable assistants during a period of several months was granted by Governor James M. Cox, of Ohio, who later became a heavy investor in Florida property. Loan of the services of an experienced newspaper man, for the citrus canker committee headquarters in the national capital, also was made by the publishers of the Washington Evening Star.

Sums asked of congress were extremely modest in size, especially if judged by present day standards. Yet indisposition to provide the money was pronounced, and frequently reached discouraging proportions. Support of the appropriations from states that canker did not menace alone enabled the program to be carried through.

Congressman Lever was one of the first of the federal legislators who rallied to the relief of Florida and his advocacy of her cause was consistent and persistent. Members of the Florida delegation in congress were aggressive and irrepressible—Fletcher, Bryan and Trammell in the senate, Sparkman, Clark and others in the lower house.

Owners of the groves or like holdings in the state who resided elsewhere gave invaluable help through their congressmen. Before long, legislators of great influence, including "Champ" Clark and "Joe" Cannon, were lined up for the appropriations.

Success is Final Outcome

Difficulties were dealt with only as tests of ability to overcome, in the program of Gillett and his co-workers, in congress and out. Cooperation was received from the United States Department of Agriculture, the bureau of plant industry in which was charged with supervision in the spending of federal funds. Dr. Wilmon Newell was employed by the State Plant Board to direct the eradication campaign, and came to Florida in the fall of 1915.

Expenditures from appropriations by congress prior to April 30, 1920, when it was conceded that success was in sight, amounted to $861,466.95. In subsequent years the funds supplied from the federal treasury were in much smaller sums. When the final accountings were made, after it became an acknowledged fact that the contest had been won, the total of United States money that had been used stood at $1,063,251.03.

Florida in the meantime had furnished an aggregate of $1,431,945.92 of state funds while contributions from provate sources, which had been expected through the State Plant Board, reached the figure of $85,019.62. Growers and business men of Dade county, where the canker outbreaks were most severe gave a large proportion of the amount. The Florida Growers' and Shippers' League collected substantial sums.

Progress toward control of the disease was extremely slow in 1914 and 1915. Outlook for a favorable result was considered quite discouraging at the end of the latter year. Improvement in an appreciable degree was recorded during 1916, and 1917, 1918 and 1919 showed accumulating evidences of victory.

Infections of a sporadic and localized character were found in 1920 and again during 1922-23. Latest outbreak of record was discovered late in 1927. Since that time, citrus canker has disappeared from the state. Authorities of the highest competency have confirmed the completion of eradication.

A bacterial plant disease never before was eliminated from any area. Credit therefore is given to the State Plant Board for an accomplishment of exceedingly noteworthy nature. Experts and specialists from many lands have visited Florida for intensive study of the methods.

Significant also is the fact that the system developed in warring on citrus canker was utilized, in slightly modified form, when the Mediterranean fruit fly found its way into Florida. Eradication of the pest likewise established a record.

Citrus canker first was noted in Florida during 1912. Futility in fact had marked the assault on the disease for three years thereafter. By 1915 the spread had been into 10 counties of the state's fruit belt.

While that 20 years ago period was "only yesterday" as history is made, the changes in citrus Florida since have been momentous and of far-reaching import. Changes have been fundamental.

Destiny surely has a purpose and a place for any industry permitted to surmount seemingly unconquerable obstacles as grapefruit and orange growing has done in Florida.

All credit and honor to the men and women, living or dead, who took part in averting the menace of citrus canker that was so threatening in 1915.

Tung Oil Trees

FLORIDA EXPERIMENTAL RESULTS ARE USED IN NEW ZEALAND GROVES

Experimental use of zinc sulphate on tung oil trees in Florida has resulted in the application of this compound to tung trees in New Zealand with gratifying results, it has been learned by Experiment Station horticulturists.

Around a year ago G. Stuart Johnson of the New Zealand Tung Oil Corporation, Auckland, was in Florida looking over tung oil groves. He noted the excellent response of bronzed trees to zinc sulphate in experiments being conducted by Harold Mowry and Dr. A. F. Camp of the Florida Experiment Station and various growers. On returning to New Zealand, he recommended this material for the 2,000 acre grove belonging to his company. It was applied to the entire grove last spring (about September and October in New Zealand).

In a letter just received by H. W. Bennett of Gainesville, who has the largest tung oil groves in the world, Mr. Johnson states that "remarkable results" were obtained in the correction of chlorosis.

Ants and termites are often confused, and the latter insects many times are referred to as flying ants. While the two groups of pests are similar in appearance, the absence of slender waists in the termites is a certain means of determining them. Termites also have darker bodies and the sexual forms are much larger.

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SOME FIELD EXPERIMENTS FOR THE CONTROL OF MELANOSE AND STEM-END ROT OF CITRUS

(Continued from Page 7)

to be very favorable for melanose and, from the experimental point of view, the greater differences between sprayed and unsprayed trees are more significant.

The general set-up of the plots, with treatments and dates, and the results for 1934 at Babson Park are given in Table II. Final results were recorded from September 4 to 13 and the fruits were grouped into classes of infection as was done the previous year. By considering the first two classes of fruit as first grade, it will be seen that bordeaux 3-4-50 applied in April followed by one percent oil in June, bordeaux 1½-2-50 applied in April followed by two applications of lime-sulfur, basic copper sulfate with one percent oil applied in April and followed by one percent oil in June, and bordeaux 1½-2-50 applied in April followed by oil in June gave best control of melanose. The early February or delayed dormant application of bordeaux-oil 3-4-50 plus one percent oil, when followed either by two applications of lime-sulfur in April and May or by oil in June was much less effective than when it was applied in April. Furthermore, lime-sulfur apparently had little effect in further reducing the percentage of melanose blemish when applied following a dormant application of bordeaux. Again, the sulfurs alone gave very poor control of melanose.

From the results of these two years' experiments, it is probable that growers will wish to adopt a spray program. In selecting the kinds and amounts of materials to use, it is well to bear in mind certain points in connection with the use of them that were observed during these tests. (1) The use of bordeaux-oil seems limited. Best results were obtained when the bordeaux was applied in April soon after the fruit is set. If oil is applied in combination with bordeaux, there is danger of burning and shadowing the young fruits. This is true with most of the commercial grades of oil. (2) Half-strength bordeaux, when applied at the proper time, has proved about as effective for the control of melanose as full-strength, 3-4-50. A little better results were obtained by following this weaker bordeaux with lime-sulfur than by following with oil. Half-strength bordeaux lessens the amount of residue left on the foliage. It also lessens the amount of copper which is applied per tree, which should not be so injurious to the trees. (3) Some of the commercial forms of the copper sprays appear about as effective as half-strength bordeaux for the control of melanose and they leave very little residue. Many of these materials are relatively new and should be tested further to insure their proper use on citrus. (4) Bordeaux applied during the dormant season reduces the amount of melanose fruit blemish, but not sufficiently to justify its use in older groves for this purpose alone. (5) The sulfur materials which have been tried are less effective than the copper sprays in the control of melanose fruit blemish.

In the second and third phases of this paper, experiments conducted in a single block of trees located at the Citrus Experiment Station will be discussed. This planting consists of ten-year-old grapefruit trees with a total of 512 trees divided equally among the Excelsior, Duncan, Marsh and Walters varieties, planted in row sequence. The rows of these varieties are 16 trees deep running in the east-west direction; the repetition of the four varieties takes place eight times in the north-south direction. The planting was divided into eight two-row plots; two plots each receiv-

TABLE II.—RESULTS OF SPRAYING EXPERIMENTS FOR THE CONTROL OF MELANOSE IN 1934. O. D. JAQUESS GROVE, BABSON PARK, FLA.

Plot No.	Spray Treatment	Dates Applied	No. of Trees in Test	No. of Fruits Examined	Percentages of fruits showing indicated number of melanose lesions per sq. inch				
					No. Lesions	1-10	11-25	26-50	50 Plus
1	(1) Bordeaux 1½-2-50 plus caseinate (2) Lime-sulfur 1-40 (3) Lime-sulfur 1-40 plus caseinate	Apr. 9 Apr. 24 May 7	25	2000	5.2	71.3	17.4	4.6	2.5
2	(1) Bordeaux 1½-2-50 plus caseinate (4) One percent oil	Apr. 9 June 1	26	2000	2.2	60.8	27.9	7.1	2.0
3	(0) Bordeaux 3-4-50 plus 1% oil (2) Lime-sulfur 1-40 (3) Lime-sulfur 1-40 plus caseinate	Feb. 6 Apr. 24 May 7	26	2000	0.9	25.5	35.9	27.3	10.4
4	(0) Bordeaux 3-4-50 plus 1% oil (4) One percent oil	Feb. 6 June 1	26	2000	0.2	21.2	41.8	25.8	12.0
5	(1) Lime-sulfur 1-40 plus Kolofog 4-100 (2) Lime-sulfur 1-40 plus Kolofog 4-100 (3) Lime-sulfur 1-40 plus Kolofog 4-100	Apr. 10 Apr. 25 May 7	26	2000	0.9	25.2	35.2	28.1	10.6
6	(1) Lime-sulfur 1-40 (2) Lime sulfur 1-40 (3) Lime-sulfur 1-40 plus caseinate	Apr. 10 Apr. 24 May 7	26	2000	0.3	19.3	43.3	29.1	8.0
7	(0) Dupont No. 2. 1-60 (1) Dupont No. 2. 1-60	Feb. 6 Apr. 9	25	2000	0.0	10.0	34.5	40.0	15.5
8	(0) Dupont No. 2, 1-60	Feb. 6	26	2000	0.0	9.7	36.6	39.5	14.2
9	(1) Basic copper sulfate 1½-50 plus caseinate (2) Lime-sulfur 1-40 (3) Lime-sulfur 1-40 plus caseinate	Apr. 9 Apr. 24 May 7	26	2000	0.9	48.5	36.0	11.7	2.9
10	(1) Basic copper sulfate plus caseinate - plus oil (4) One percent oil	Apr. 10 June 2	26	2000	0.8	64.2	30.9	3.3	0.8
11	(1) Bordol-Mulsion 1-50 plus caseinate (4) One percent oil	Apr. 10 June 1	26	2000	0.1	33.9	45.9	15.9	4.2
12	(1) Bordeaux 3-4-50 plus caseinate (4) One percent oil	Apr. 10 June 1, 2	26	2000	2.3	74.9	20.9	1.6	0.3
13	Unsprayed (check)		52	2000	0.0	6.4	22.6	44.3	26.7

ing one of the following four treatments: (1) neither pruned nor sprayed, (2) sprayed but not pruned, (3) pruned but not sprayed, (4) pruned and sprayed. This experiment was started in May, 1932. Pruning has been done regularly in this grove, the first year in May, then in February, and this past season in March because of cold damage to some of the trees. The grove has been sprayed about April 15-20 of each year with a bordeaux mixture. This is followed regularly in May or June with a one percent oil, and the entire planting usually receives a one percent oil in the fall. Estimated cost of the operations per tree has been 13.8 cents and 18.3 cents, respectively, for the two years.

TABLE III.—RESULTS OF SPRAYING AND PRUNING FOR THE CONTROL OF MELANOSE AND STEM-END ROT IN GRAPEFRUIT, CITRUS EXP. STATION. 1934-35*

Plot No.	Treatment	Fruit Blemish Control Percentage in No. Lesions per sq. Inch: No. of Fruits	No Lesions	1-10	11-25	26-50	50 Plus	Stem-end Rot Control Stem-end Rots: No. of Fruits	Stem-end Rots: Phomopsis	Stem-end Rots: Diplodia	Misc. Rots	Percentage of Total Fruits Rotted
1, 8	Unsprayed, unpruned	4000	0.02	22.1	34.1	24.3	19.5	800	479	2	2	60.1
2, 7	Sprayed, unpruned	4000	28.5	64.0	6.9	0.5	0.1	800	230	3	2	29.1
3, 6	Unsprayed, pruned	4000	0.02	46.7	44.3	7.3	1.6	800	429	4	3	54.1
4, 5	Sprayed and pruned	4000	56.9	41.0	1.9	0.1	0.05	800	117	3	3	15.0

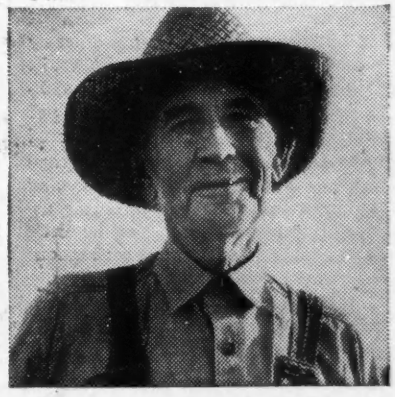
* Sprayed April 17-18, 1934. Pruned in February.

The results in this grove last season were very clear-cut. A summary of results obtained from all varieties in fruit blemish control and the subsequent development of stem-end rot in 3200 of these fruits, when they were held in shed storage for 60-65 days are shown in Table III. It may be seen that the sprayed and pruned trees showed only about two per cent of second grade fruits, and the total stem-end rot in fruit from these trees was 15 per cent. The sprayed but not pruned trees showed about eight per cent second grade fruits, which developed about 29 per cent stem-end rot. The pruned but not sprayed trees showed about 53 per cent second grade fruits with 54 per cent stem-end rot. The fruits from the trees which were neither pruned nor sprayed showed about 78 per cent second grade fruits with 60 per cent stem-end rot. Of the total fruits rotted, less than two per cent was caused by organisms other than the melanose fungus.

This is the most clear-cut evidence that we have secured on these two points. There is every indication in all of our work with melanose that spraying, if properly handled, is superior to pruning alone, for melanose control. And yet in older groves, there is also every indication that spraying alone (with one application of the fungicide) will not produce the maximum control of this disease. In the McMullen Grove near Largo, on old grapefruit trees in 1933, 55 to 75 per cent of estimated first grade fruits were obtained from unpruned trees, but when similar trees were pruned and then sprayed, this estimated first grade was increased by about ten per cent. In 1934, with 73 to 83 per cent first grade fruits, the first grade was again increased by about ten per cent in the pruned trees. It seems, as the grove becomes older, that the fungus becomes more general and abundant, so that for the maximum control one must either

(Continued on page 26)

"AN' BE SURE IT'S NATURAL"



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NATURAL NITRATE
THE OLD ORIGINAL SODA

WHAT CITRUS FRUITS COST FLORIDA GROWERS IN THE YEAR 1932-33

(Continued from page 5)

larger per grove, and a higher per cent of Valencia oranges than the remaining 45 groves on which the returns were less than cost. There were 35 groves on which the net returns ranged between $50 and $100 per acre; 15 groves between $101 and $200; 3 groves between $201 and $300; and one grove's net return amounted to $362.72 per acre.

Turning to the younger groves, we find that the average cost of developing the groves and obtaining the average production of 55 boxes of fruit for the 82 groves 10 years old and under was $28.71 per acre. Costs ranged on these groves from $8.15 to $87.44 per acre. Total returns varied from $3.92 to $343.96 per acre with an average return of $44.62 per acre or approximately $.81 per box for all varieties of fruit. After paying all costs, this left $15.-91 per acre or a return of $.29 per box for interest on capital invested and owner's supervision. The average cost per acre for labor, power and equipment was $12.50; fertilizer used $11.30; spray and dust material $1.27; taxes $3.00 and miscellaneous costs amounted to $.64 per acre.

Of the 82 groves 10 years old and under, the fruit returns from 51 groves paid all costs and $36.96 per acre was left for interest on capital invested and owner's supervision. This left 31 groves on which the expenses were greater than returns.

Prices Received for Fruit. — The average prices received for all counties by varieties of oranges were: Parson Brown $.63, Pineapple $.64, Valencia $1.05, and all miscellaneous oranges $.66 per box, which includes a small sample of seedlings, blood oranges and Jaffas. All oranges averaged $.89 per box as compared to $.61 for the fruit season 1932-33 and $1.26 per box for 1931-32 fruit season.

The average price received for all varieties of grapefruit was $.68 per box, which was the highest price received since the record work began. Grapefruit sold for an average of $.43 per box for the fruit season 1932-33, $.56 in 1931-32, and $.48 in 1930-31. Of the four principal counties from which records were obtained, namely, Lake, Polk, Orange and Highlands, the Lake County growers received the highest amount for their grapefruit. This amounted to $.76 per box or an average of $.08 greater per box than the other 3 counties for the 1933-34 fruit season.

Comparison of 3 years' costs and returns. — Of the 118 original growers who cooperated in 1930-31, 62 have furnished records on their groves for three years. During the year three additional growers supplied the Extension Service with their records for the same period, making a total of 65 three-year records.

The total cost per acre excluding interest on capital invested and depreciation on trees for the year 1930-31, was $79.99; for 1931-32 $64.75; and for the year 1932-33 $61.17 per acre. This made a total reduction in cost of production of $18.82 per acre on $.10 per box from 1930-31 below that of 1932-33. The average cost of production in 1930-31 was approximately $.60 per box and for 1932-33 $.50. There was a greater percentage reduction in taxes from 1930-31 to 1932-33 than in any other costs. However, the greatest decrease in dollars per acre was in fertilizer costs, which was largely due to more economical fertilizing practices, as the amounts of available plant food applied remained practically the same for each of the three years. The reduction in cost of labor, power and equipment of approximately 10 percent for each year below that of the previous year was due to less cultivation and lower labor rates.

Net returns per acre for interest on capital invested and owner's supervision for 1930-31 was $33.35, for 1931-32 a loss of $11.40 and for 1932-33 year $19.25 per acre. The net returns on a per box basis were $.27 for 1930-31, –$.89 for 1931-32 and $.16 for 1932-33. Total returns and net returns per acre were greater for 1932-33 than for 1931-32, but less than for the crop produced during the crop year 1930-31.

A more detailed report of the costs and returns study of 264 Florida citrus grove records for the crop year 1932-33 may be obtained from County Agents in the citrus areas or by writing to the Agricultural Extension Service, University of Florida, Gainesville, Fla.

CONTROL OF CITRUS RUST MITE WITH SULPHUR

(Continued from page 9)

wet readily and quickly when added to either hard or soft water or dilute lime-sulphur solution. Wettable sulphurs, of which there are a number on the market, should be made from superfine dusting sulphur of which at least 95 percent should pass a 300 mesh sieve, by treating and combining it with wetting and sticking agents. The actual sulphur content should be taken into consideration with the view of maintaining the total sulphur strength of the spray at fifteen pounds per hundred gallons, as called for in the table.

DUSTING SULPHURS. — It is desirable to use for dust application sulphur having a minimum fineness of at least 99 percent passing 200 mesh, which is equivalent to 93-95 percent passing 300 mesh. Such sulphurs, which are usually guaranteed 99.5 percent pure, have the unfortunate property of caking and lumping or balling up badly, and can be handling satisfactorily only with compartively large power-operated dusting machines.

CONDITIONED DUSTING SULPHURS. — The caking and lumping of finely ground sulphur can be overcome and the sulphur dust rendered free-flowing and non-lumping by the addition of varying amounts of a number of practically inert materials such as hydrated lime, kaolin, clay, infusorial earth and magnesium carbonate, the use of which latter material, however, is patented. Such conditioned sulphur dusts are to be especially recommended in case application is to be made by hand dusters or by airplanes.

The cost of making the application is usually the most expensive item of citrus pest control and the best re-

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sults are secured only when a sufficient quantity of sulphur is used. Growers who try to economize by using only one fourth or one fifth pound of sulphur per tree when three fourths to one pound should be used always find that mites come back very quickly. In this case they invariably find it necessary to make one or two additional applications to assure bright fruit, and that is always more expensive than using sufficient sulphur in the original application to give necessary protection.

As long as there is enough sulphur on the trees, rust mites cannot live there. It has been found that it is most economical to apply much more sulphur than is necessary for a complete kill, the excess sulphur on the leaves serving to control mites as long as it persists. A lump of sulphur acts much like a piece of ice, it may grow smaller but otherwise there is no change either as to purity or the way in which it acts. In other words, sulphur is effective as long as it is present in sufficient quantity.

Comparatively small amounts of sulphur per tree will kill a great many mites, but if insufficient quantities are used the residue is likely to disappear so rapidly that there will be none left when the eggs hatch, and within a week or ten days there may be almost as many mites as were present before the treatment.

If a half to one pound of sulphur is used per tree per application, it will not only kill all the mites then present, as well as the eggs about to be hatched, but will destroy the young mites as they later hatch from the eggs. Mites carried in from the outside will also be killed as long as the sulphur is present.

Summary

Rust mites reduce the value of citrus fruit crops from ten to fifty per cent. During times of low prices No. 1 fruit yields the only profit for the citrus industry.

Effects of injury from citrus mites appear on the fruit in the form of "russeting". The grade is lowered, and the fruit is smaller. The keeping quality of russet fruit is inferior to that of bright fruit. The leaves and branches of the tree are also injured.

Sulphur dust and lime-sulphur sprays, preferably reinforced with wettable sulphur, both control rust mites. Sulphur dust, however, is safer, especially during hot weather. It is usually more quickly and cheaply applied.

Sulphur dust should be applied when mites first appear in the spring and at intervals of from six weeks to two months thereafter.

When one half pound of sulphur dust per tree is used on medium sized trees and one pound on full size bearing trees, all the rust mites present are killed. The young mites later hatching from the eggs and mites coming in from the outside are killed as long as sufficient sulphur remains on the trees.

THREE NEW CARNATIONS

Rigoletto, Mavourneen, and Carlotta are the names of three new varieties of carnations recently created by the Bureau of Plant Industry, according to information received from Washington by the State Agricultural Extension Service.

The new varieties, created by crossing of old varieties, are described as "of easy culture, readily-propagated, and free flowering." Rigoletto is dark red, Mavourneen is light pink, and Carlotta is dark pink.

Fertilize Your Citrus Groves with NON-LEACHING 'Aero' Cyanamid in the

'AERO' CYANAMID supplies non-leaching NITROGEN to feed the tree and LIME to sweeten the soil

NITROGEN ALONE MEETS THE REQUIREMENTS FOR ONE APPLICATION PER YEAR

Citrus groves in Florida require applications of nitrogen, phosphoric acid, and potash. It has been the common practice to apply all three of these plant foods every spring, summer, and fall—three times a year.

The evidence shows that at least one application during the year may well consist of nitrogen alone. *Many Florida growers, who now use only Cyanamid for their summer or fall applications, are pleased with the excellent condition of their trees, and also with the* ***cash savings effected.***

Applied any time during the year when there is plenty of moisture in the soil, Granular 'Aero' Cyanamid—27 per cent ammonia and 70 per cent hydrated lime—supplies the necessary nitrogen required for tree growth and fruit production, and lime to sweeten the soil. It is not washed out of the soil by heavy rains.

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1021 EDGEWATER DRIVE ORLANDO, FLORIDA

Yothers Retires From Government Service

W. W. Yothers of Orlando, who has been actively connected with federal research work in Florida for so many years that most citrus growers have forgotten when he was not thus employed, has retired from Federal service and will henceforth be engaged in independent research work for the growers.

In his work for the Department of Agriculture, Mr. Yothers has done a most valuable service for the growers of Florida in his experiments in pest control—a work which has been of inestimable value to the industry.

Growers generally have recognized his worth and have greatly appreciated his efforts, and there will be general regret over his retirement from the work of the department. However, this regret will be somewhat modified by the fact that his knowledge and experience are still to be exerted on behalf of Florida citrus growers.

SUMMER FERTILIZING FOR GROVES

(Continued from Page 19)

basic fertilizers are the most efficient in the long run. The word "basic" is used in a very general way here. Many of the very best standard mixtures are found to be approximately neutral in reaction, based on present theory. According to reports on their long time use at Lake Alfred and in general practice, they are safe. Such mixtures are included in the general meaning of the word "basic" as herein used. Extremely basic mixtures, as well as very acid mixtures, are of course not included.

This is based on fourteen years of scientific research by the State Experiment Station as well as a much longer period of time in practical use; and more recent progress reports of research work by the Department of Agriculture.

This would also tend to suggest caution to those who are inclined to adopt as permanent practice, the temporary results of short lived experiments or observations.

Economy Necessary With Some

For reasons which need no discussing, some growers simply will not be able to buy or use what they believe to be the best in fertilizers. It is for just such cases that many of the leading companies are now offering what they term "medium analysis" mixtures. These mixtures are made of standard ingredients, but due to their slight concentration, they do not permit large quantities of bulky materials such as steamed bone meal, castor pomace, tobacco stems, etc.

However such mixtures do have a normal balance as to nitrogen, available phosphoric acid and potash and are generally considered to be the safest economical substitute for highest quality, single strength fertilizers that can be had.

Such data as mentioned above, and presented by research workers of the State and Federal Government, seem to point to the need for a complete ration for the tree and the soundness of using properly made fertilizers as a basis for a permanent fertilizing program, under conditions that exist over the greater part of the citrus belt. There are undoubtedly many exceptions to this, both in individual cases and local areas.

For those of us who are a little bit "short" right now the medium analysis mixtures offer the most economical method of following this practice during the period of time when the grove owner must watch every penny.

SOME FIELD EXPERIMENTS FOR THE CONTROL OF MELANOSE AND STEM-END ROT OF CITRUS

(Continued from Page 23)

use more applications or prune and spray. Observations on the trees indicate that large amounts of bordeaux may injure the trees.

In the matter of stem-end rot control, it is apparent that there is a lessening of stem-end rot after bordeaux spraying. Fulton reported this condition some years ago. In cleaning up your groves, it seems that you will be lessening the field infection, which later leads to stem-end rot in transit and storage.

PERSONAL

QUIT TOBACCO easily, inexpensively, without drugs. Send address. N. A. Stokes, Mohawk, Florida.

THRIFTY TREES and budwood from record performance Perrine Lemon parents, Persian Lime and other citrus varieties. DeSoto Nurseries, DeSoto City, Fla.

CROTALARIA — New crop, high quality, double cleaned, scarified Crotalaria Striata seed for sale. Attractive prices. Carolinas' Crotalaria Co., Camden, S. C.

UP to $20.00 paid for Indian Head Cents; Half Cents $125.00; Large Copper Cents $500.00, etc. Send dime for list. Romanocoinshop, D. Springfield, Mass.

WANTED: — Good second hand double orange sizer, which will run two cars. Christian & Neal, McIntosh, Fla.

Large citrus trees for replanting at special low price. Grafted avocado trees and budwood of Perrine lemon and Tahiti limes. WARD'S NURSERY Avon Park, Fla.

WANTED—To hear from owner of land for sale. O. Hawley, Baldwin, Wis.

MEN WANTED—Sell Shirts. No experience necessary. Free samples. Commission in advance. Free ties with shirts. Carroll Mills, 875A Flatbush Av., Brooklyn N. Y.

FREE Booklet describes 87 plans for making $20-$100 weekly, home or office, business your own. Elite Service, 505 Fifth ave., New York City.

CLEOPATRA MANDARIN and Sour Orange rood stock. Also Hamlin, Valencia and Persian Lime budded trees. Grand Island Nurseries, Eustis, Fla.

WANTED—To hear from owner having good farm for sale. Cash price, particulars, John Black, Chippewa Falls, Wisconsin.

PUREBRED PULLETS FOR SALE—White Leghorns and Anconas ready to ship. Barred Rocks and R. I. Reds shortly. Several hundred yearling White Leghorn hens now laying 70%. Write or wire for prices. C. A. Norman, Dr. 1440, Knoxville, Tenn.

LAREDO SOY BEANS, considered free from nematode, excellent for hay and soil improvement. Write the Baldwin County Seed Growers Association, Loxley, Alabama, for prices.

FANCY ABAKKA pineapple plants. R. A Saeger. Ankona, Florida.

FOR SALE—Selected budwood and trees of Perrine lemon, Tahiti lime, new varieties tangeloes and other citrus. Ward's Nursery, Avon Park, Fla.

DETAILED SOIL Analysis, Interpretations. $2.50. Soil Laboratory, Frostproof, Florida.

SCENIC HIGHWAY NURSERIES has a large stock of early and late grapefruit and oranges. One, two and three year buds. This nursery has been operated since 1883 by G. H. Gibbons, Waverly, Fla.

NEW COMMERCIAL lemon for Florida, the Perrine; proven. All residents need yard trees, keeping Florida money at home. Booking orders for budded stock for Winter delivery. DeSoto Nurseries, DeSoto City, Fla.

SATSUMA BUDWOOD from Bearing Trees. Hills Fruit Farm, Panama City, Fla.

SEED—Rough lemon, sour orange, cleopatra. New crop from type true parent trees. Also thrifty seedlings. DeSoto Nurseries, De Soto City, Florida.

BUDDED trees new Florida commercial lemon, proven, thin skinned, juicy, scab immune. Also rough lemon, sour orange and Cleopatra seed and liningout seedlings. DeSoto Nurseries, DeSoto City, Fla.

SEEDS—ROUGH LEMON, SOUR ORANGE, CLEOPATRA. Pure, fresh, good germination. Also seedlings lineout size. De Soto Nurseries, DeSoto City, Fla.

CROTALARIA SPECTABILIS—Seed for sale. New crop, well cured, bright and clean. Price 25c per pound in 100 pound lots and over, 30c per pound in less quantities, f. o. b. Hastings, Bunnell, Lowell and San Antonio, Florida. F. M. LEONARD & COMPANY, Hastings, Florida.

WANTED—Position as packing house foreman; in citrus business twenty-five years; ten years' experience as foreman; married man. J. R. Henry, Okahumpka, Florida.

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